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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 1595-DARPA		FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US01/16692	International filing date (day/month/year) 23/05/2001	Priority date (day/month/year) 30/05/2000	
International Patent Classification (IPC) or national classification and IPC G01N27/00			
Applicant THE JOHNS HOPKINS UNIVERSITY ET AL.			

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
- ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).
- These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:
- I ☒ Basis of the report
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☐ Certain defects in the international application
 - VIII ☐ Certain observations on the international application

Date of submission of the demand 13/12/2001	Date of completion of this report 26.06.2002
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer van Toledo, W Telephone No. +49 89 2399 2481 

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International application No. PCT/US01/16692

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1-41 as originally filed

Claims, No.:

1-33 as originally filed

Drawings, sheets:

1/8-8/8 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

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☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-33
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-33
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-33
	No:	Claims	

2. Citations and explanations
see separate sheet

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Reference is made to the following documents:

- D1: US-A-5 313 061 (DREW RUSSELL C ET AL) 17 May 1994 (1994-05-17)
- D2: US-A-4 296 322 (WECHSUNG REINER) 20 October 1981 (1981-10-20)
- D3: US-A-4 178 507 (BRUNNEE CURT ET AL) 11 Dec 1979 (1979-12-11)

Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

The present invention is related to mass spectrometry.

1. Novelty

Document D1 is regarded as being the closest prior art to the subject-matter of independent claim 1, and discloses (Fig.1a, Fig.3b) a portable mass spectrometer comprising (Abstract; Fig.1a) a sample collector 12 (Col.7, lines 5-10), an interface 16 (Col.8, lines 1-12) which routes the sample from a chromatograph to the input of the mass spectrometer 18 (Col.8, lines 24-32), the parts of which are sealed in a vacuum envelope 20 (Col.8, lines 44-56). Furthermore, a control unit 24-26-28 (Col.8, lines 57-62) is disclosed for processing the data from the spectrometer and identifying the one or more agents contained in the sample (Col.8, lines 57-60).

The mass spectrometer according to the present subject-matter differs from the one of D1 in that it comprises a transporter to transport the sample in an extraction region, a time-of-flight spectrometer, and a control unit for processing the time series output.

D2 and D3 disclose a mass spectrometer assembly in which a sample coming from a chromatograph is transported by a conduit and a transporter belt into a mass spectrometer which receives the sample transported via the transporter belt in an extraction region. In contrast to the present subject-matter, the mass spectrometer assembly of both D2 (a TOF spectrometer) and D3 (unspecified) is not designed to be used as a field portable mass spectrometer. Furthermore, neither a sample collector nor the control unit are disclosed.

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Consequently, the subject-matter of claim 1, and therefore of the respective dependent claims, is new (Article 33.2 PCT).

2. Inventive step

From the difference of the present subject-matter over the closest prior art D1, the technical problem may be regarded as how to provide an alternative field portable mass spectrometer. This technical problem has been solved according to present claim 1, by using a time-of-flight spectrometer with corresponding control unit to process the time series output.

According to D1, other types of mass analysers than the disclosed magnetic sector analysers may be used in the portable assembly (Col.6, lines 18-19). Taking this suggestion, the skilled person would consider a TOF spectrometer as an obvious selection from analogous possibilities. Such an assembly is already known from D2. However, the combination of D1 and D2 would not lead to the present subject-matter for the following reasons:

- [1] D2 is not explicit in that the spectrometer assembly is designed to be field portable. This requirement implies consequences for the TOF spectrometer design (see present descr. p.4, [0011] and p.7/8, [0020] + [0021]), which are not treated in D2;
- [2] D2 does not disclose a control unit and the control unit of D1, which processes data resulting from the voltage sweep of an electrostatic analyser, would not be directly compatible with a TOF spectrometer which requires that a time series be processed. Although the processing of TOF data is known in the state of the art, the requirement that the control unit should be part of a field portable assembly, prevents one from considering the claimed control unit as an obvious feature.
- [3] No suggestion is found in either one of the prior art items which would lead one to introduce the sample transporter of D2 into the assembly of D1.

Therefore, claim 1 as well as the claims dependent thereon, involve an inventive step (Article 33.3 PCT).

3. Industrial applicability

of the claimed subject-matter is obvious (Article 33.4 PCT).

